GIQ FOR VOLTERRA EQUATIONS OF THE SECOND KIND

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Integral equations arise in many problems of mathematical physics. In time-dependent problems whose behavior at time t depend not only on the state at time t, but also on the states at previous times, mathematical formulation leads to Volterra equation. Initial value problems can be converted by integration into the Volterra equation. Since only a few of the Volterra equations encountered in practice can be solved analytically, it is necessary to use numerical approach and establish numerical procedures.

Generalized integral quadrature is developed for the Volterra equations of the second kind. The generalized integral quadrature (GIQ) is numerical method which approximates needed integral of the function in the governing equation at a discrete point as a weighted linear sum of the function values at all discrete points in domain used for approximation. The recurrence relationship is used for calculation of weighting coefficients. The numerical procedures are presented. The numerical examples have shown accuracy of the GIQ with relatively small computational effort.